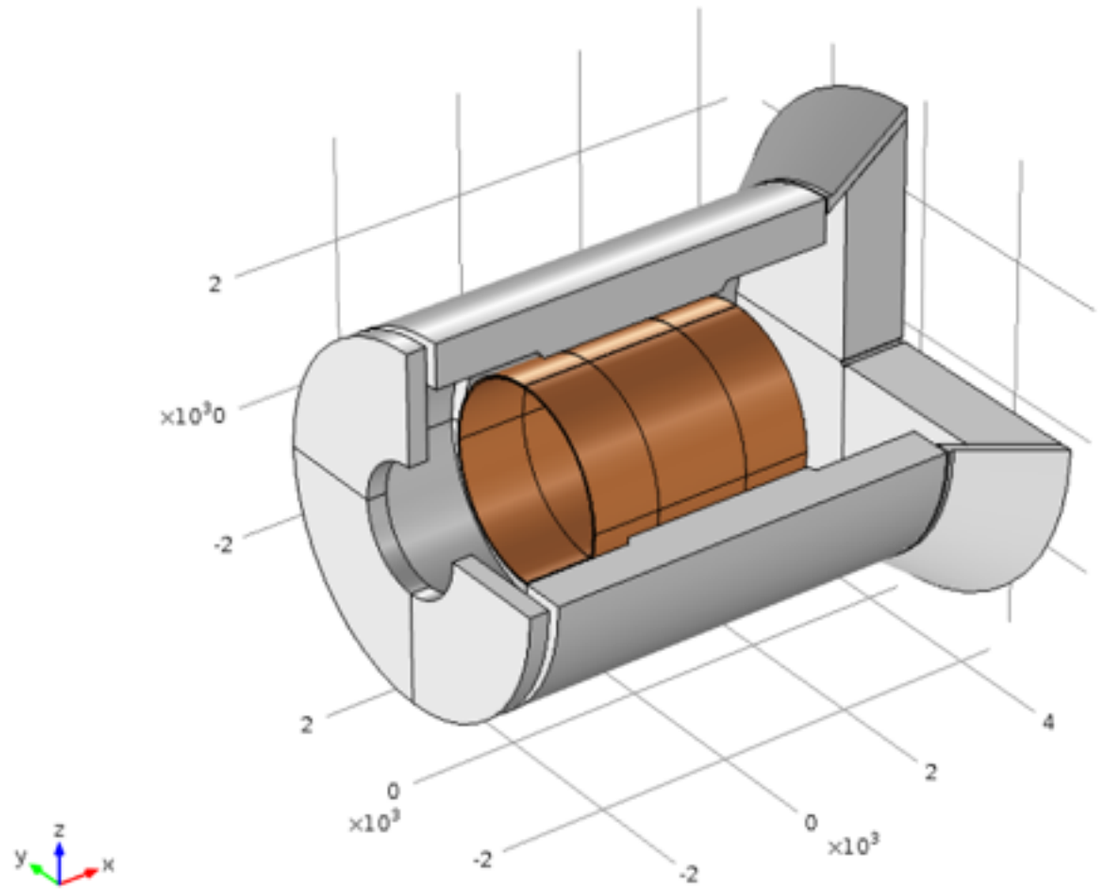
Stony Brook University

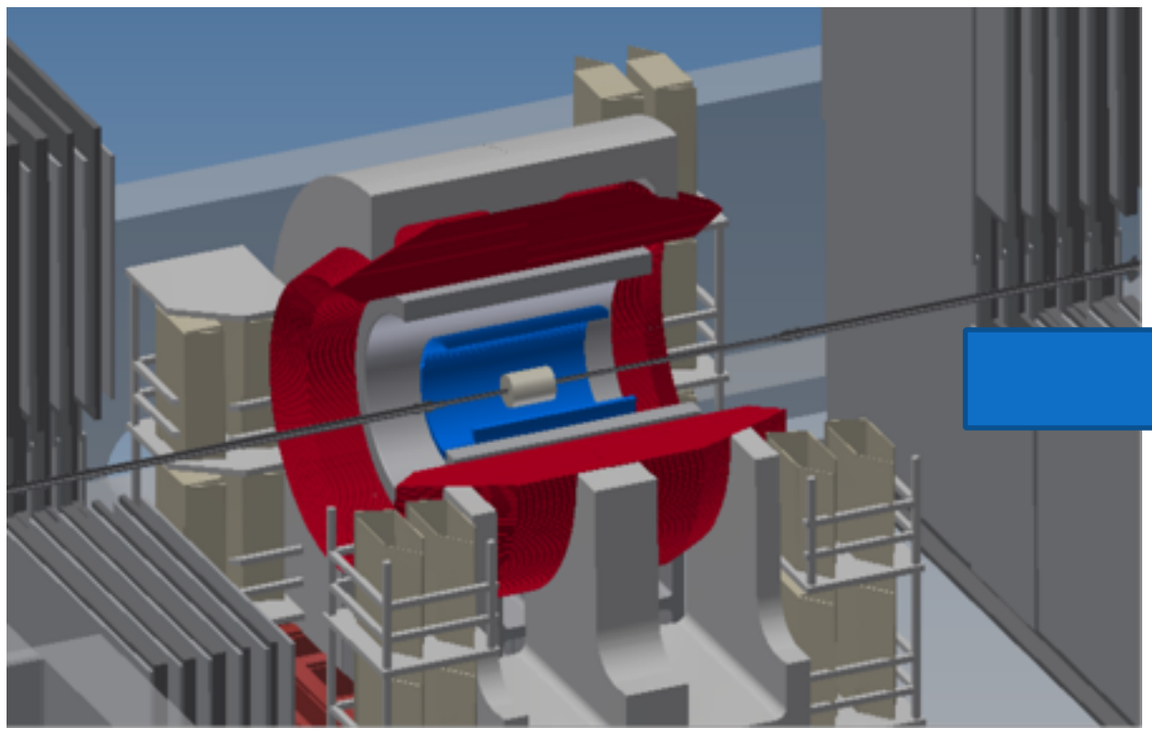


Updated Magnet Yoke Design

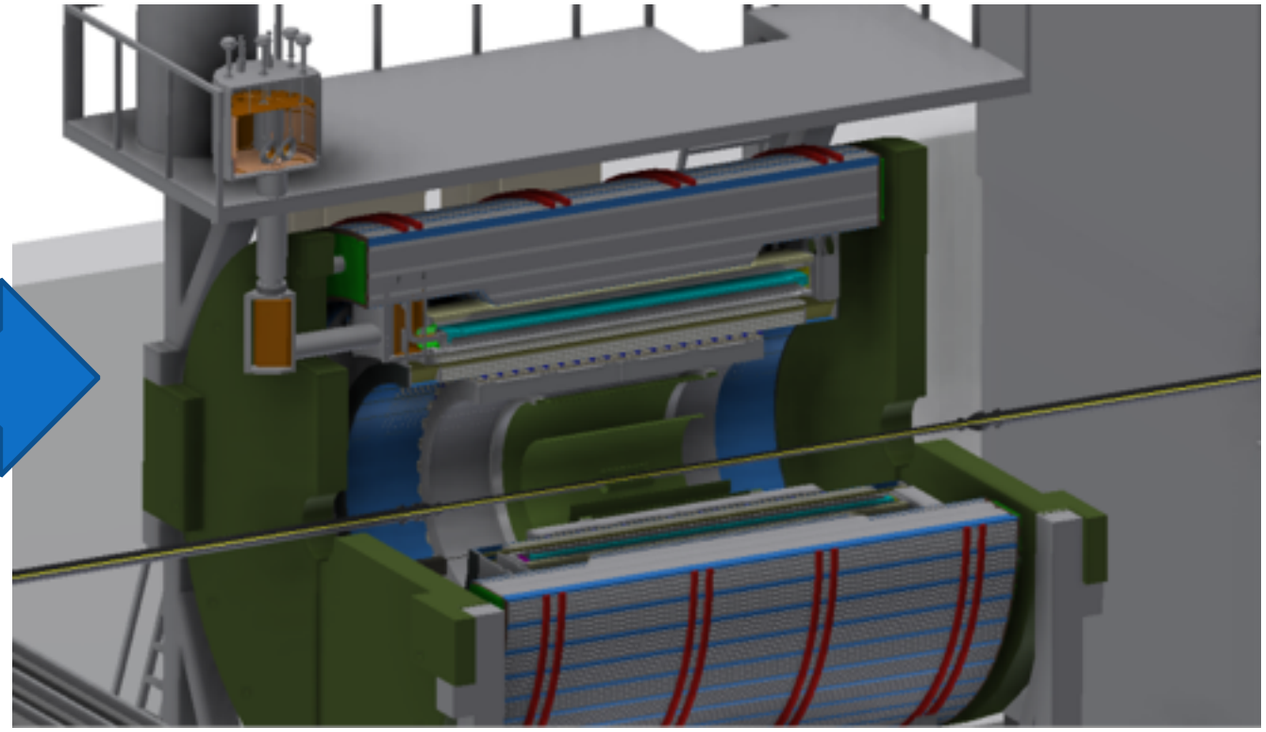
Nils Feege

Joint EIC / fsPHENIX Detector Meeting, February 10, 2015

Updated sPHENIX mechanical design

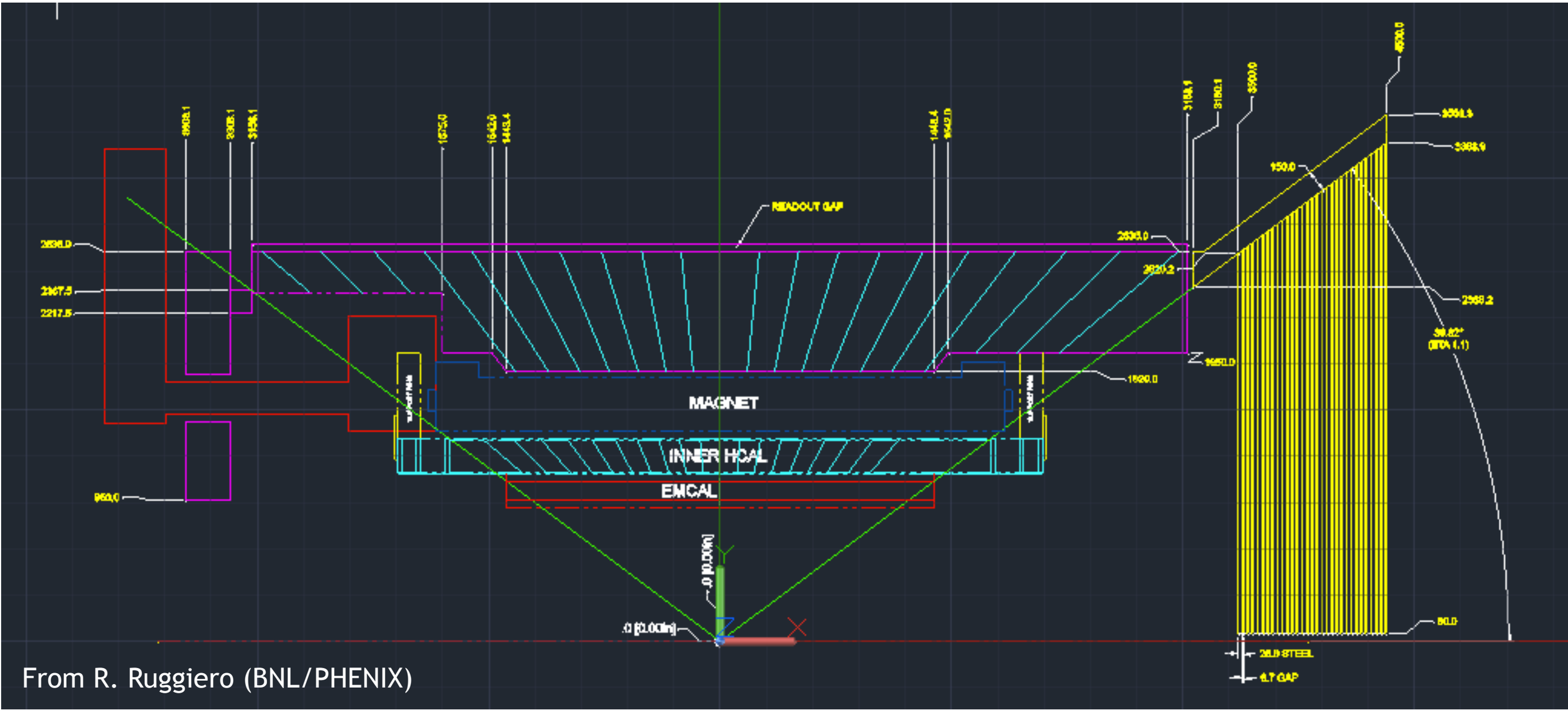


sPHENIX concept, Sept 2013 MIE, foundation of fs/ePHENIX concepts



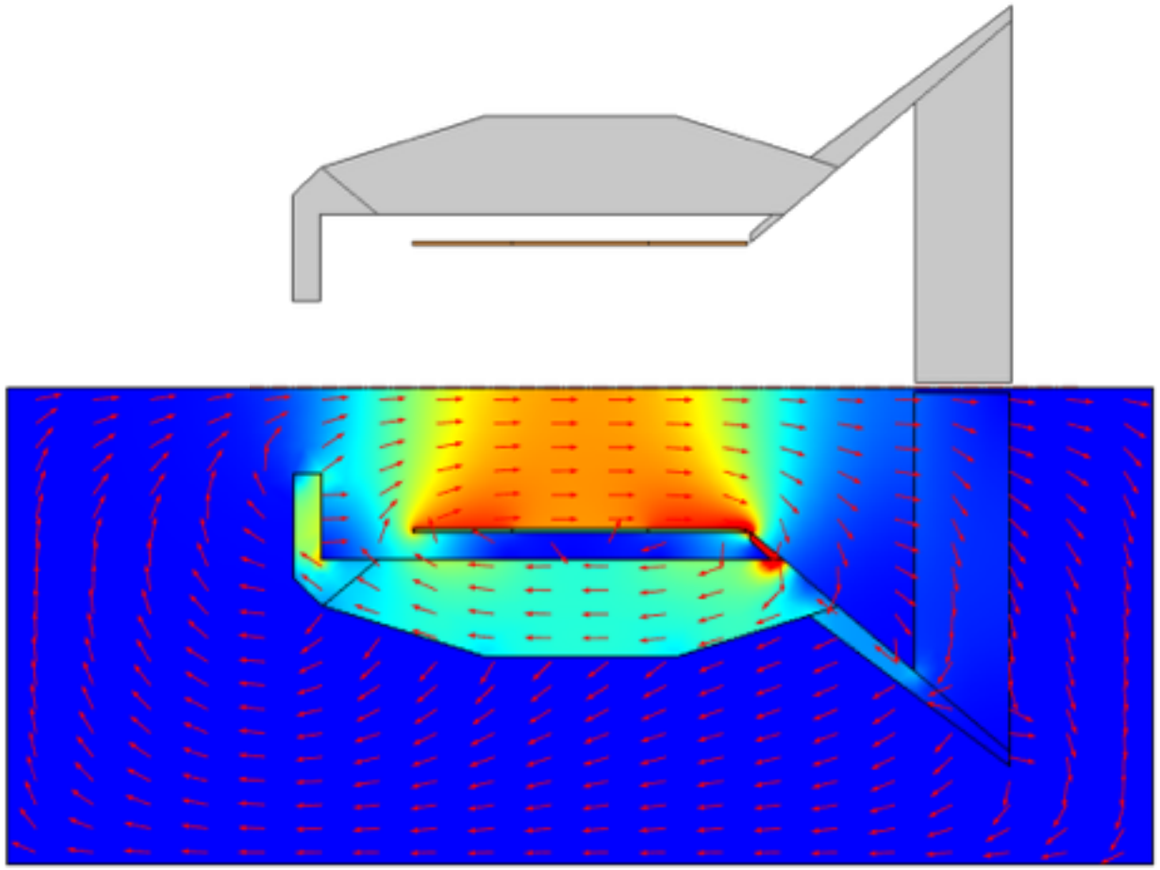
Updated sPHENIX concept Nov 2014 proposal

An updated mechanical design for EIC Detector / fsPHENIX



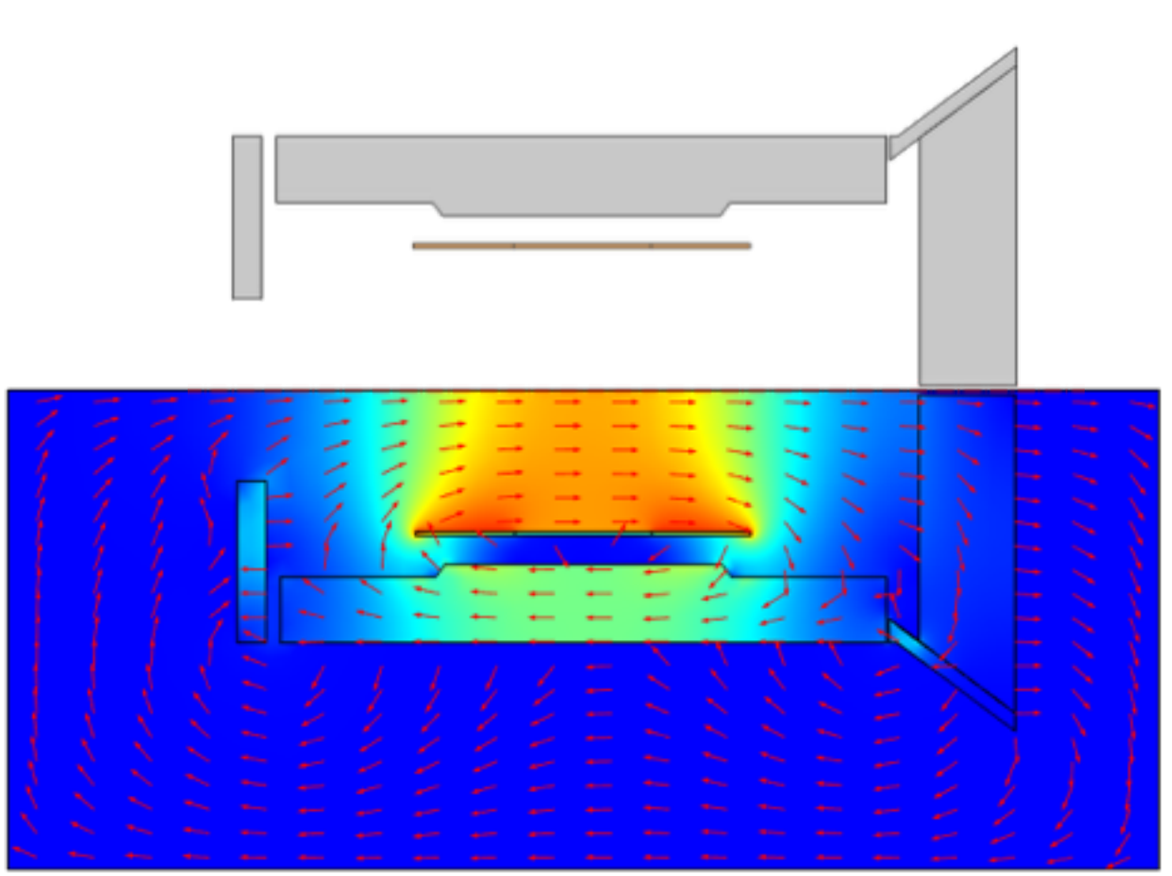
From R. Ruggiero (BNL/PHENIX)

Magnet yoke comparison in COMSOL



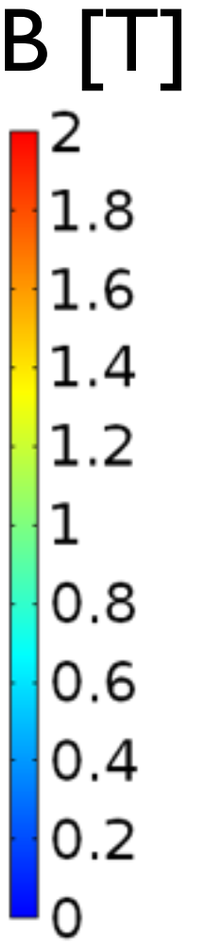
-6 m 6 m

BABAR_V11

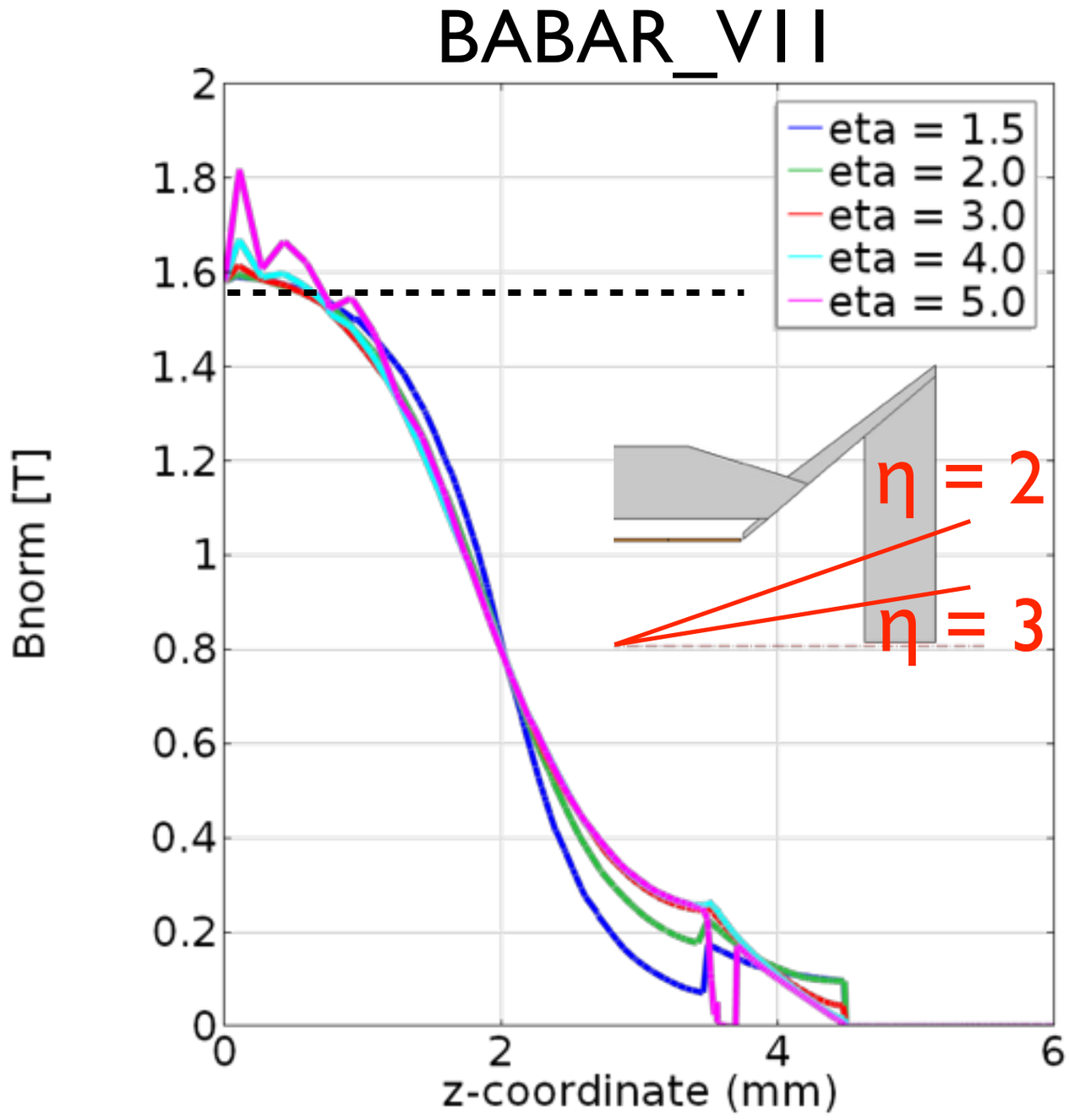


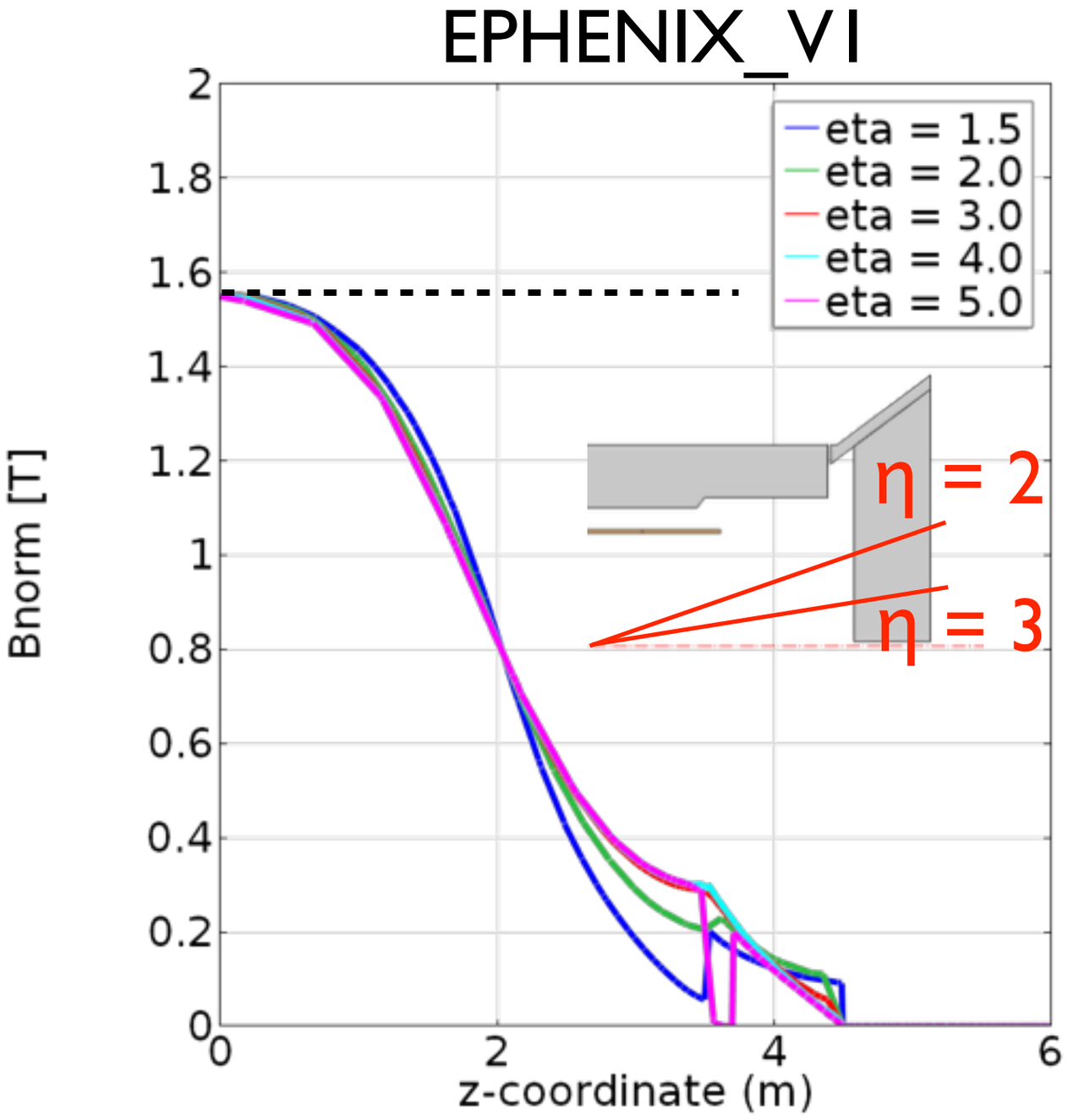
-6 m 6 m

EPHENIX_V1

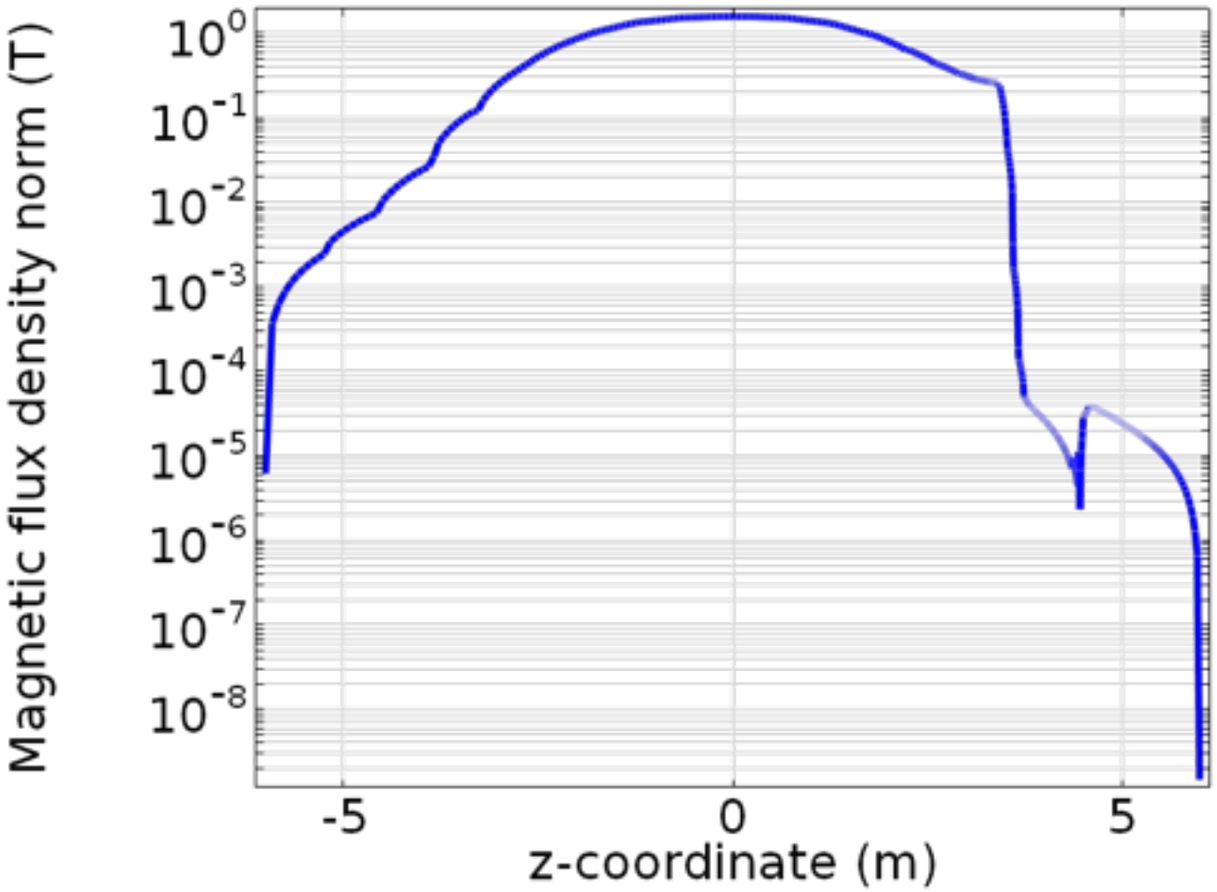


Magnetic field comparison

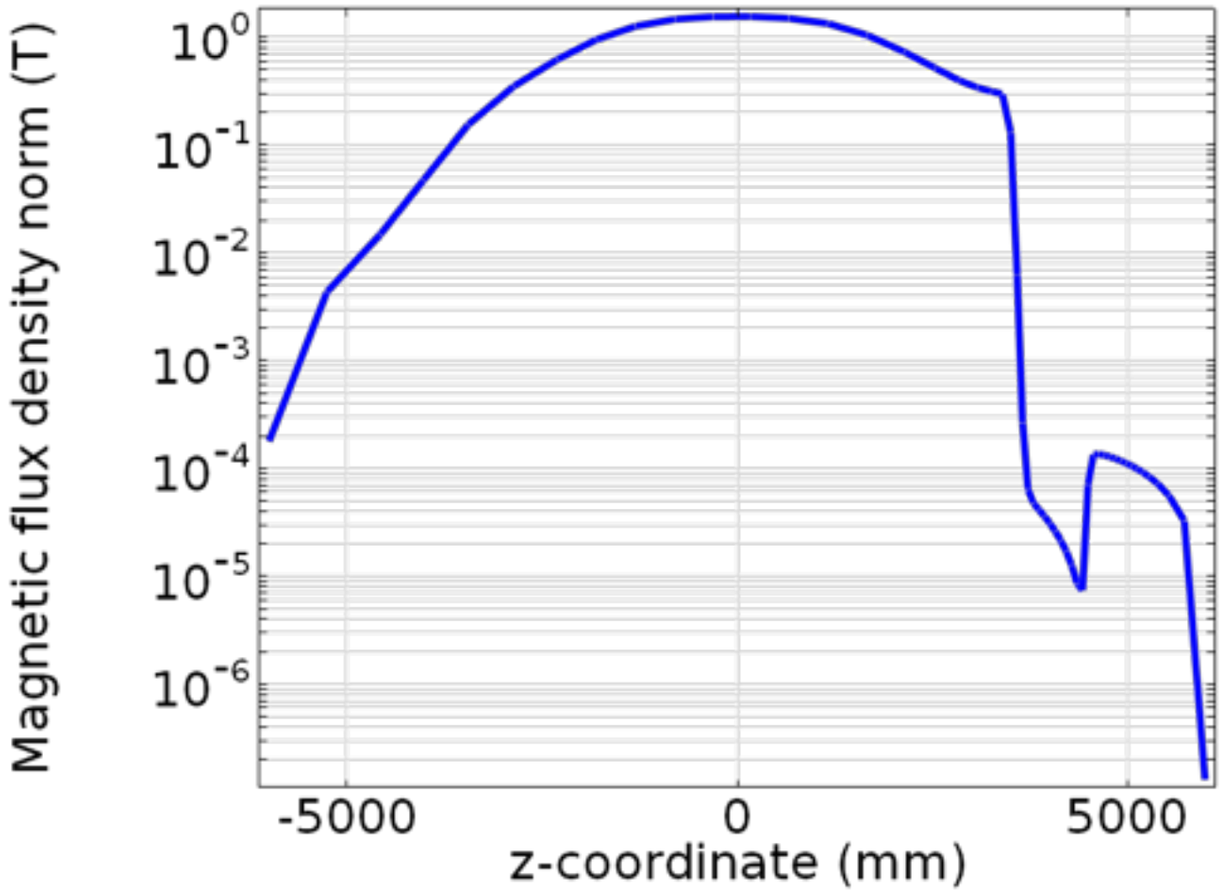




Magnetic field on beam axis

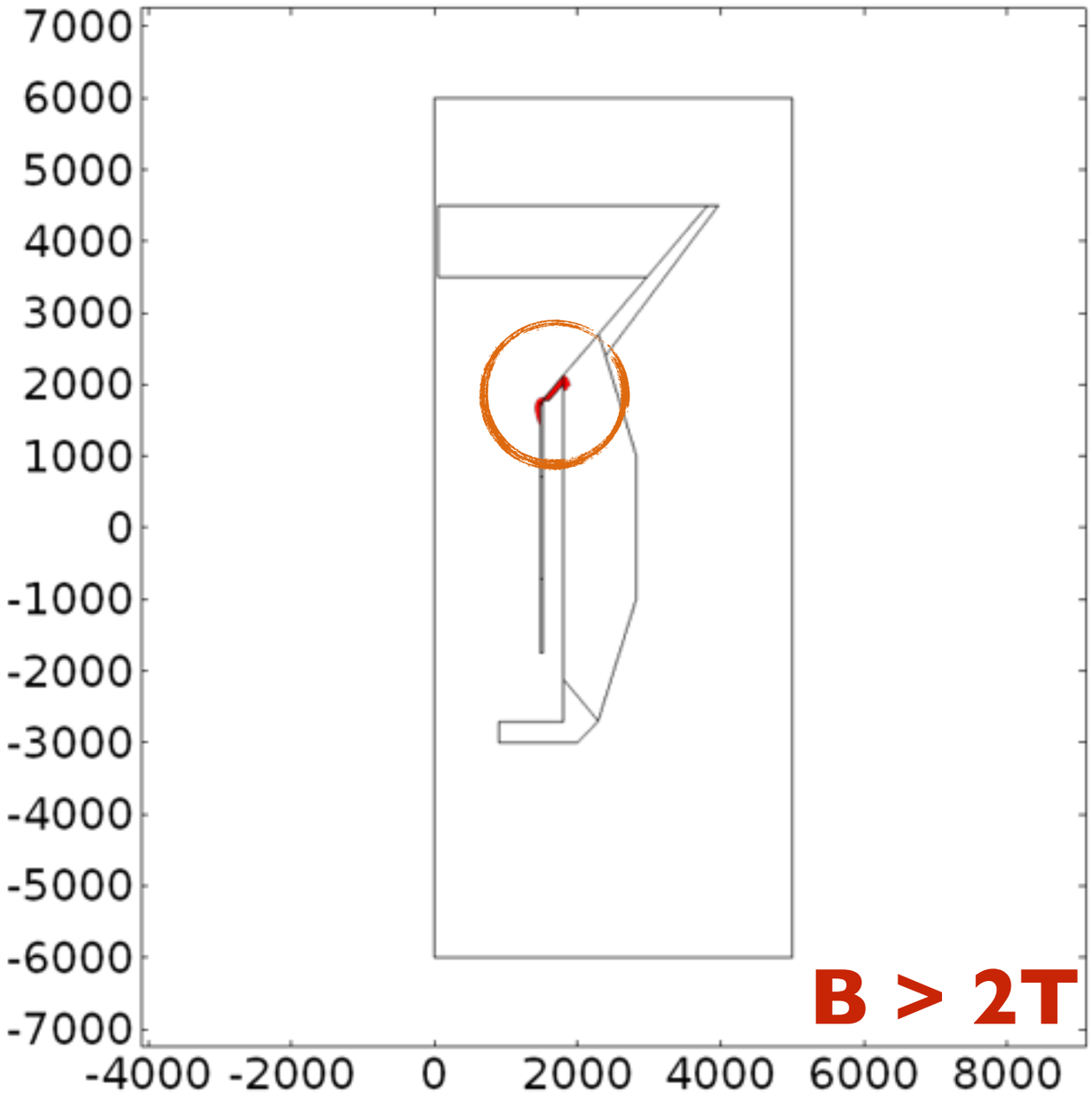


BABAR_V11

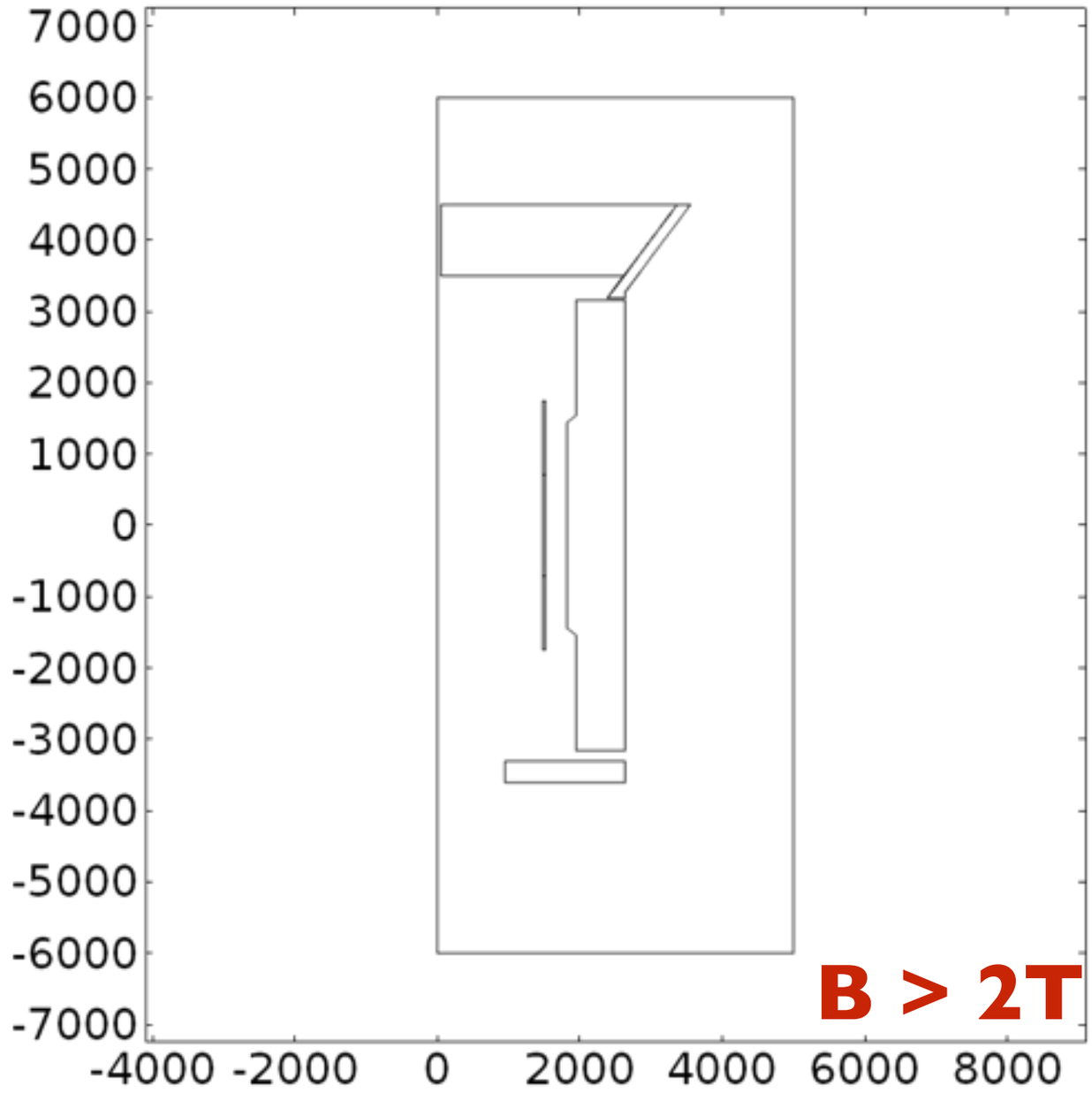


EPHENIX_V1

Check for saturation of steel

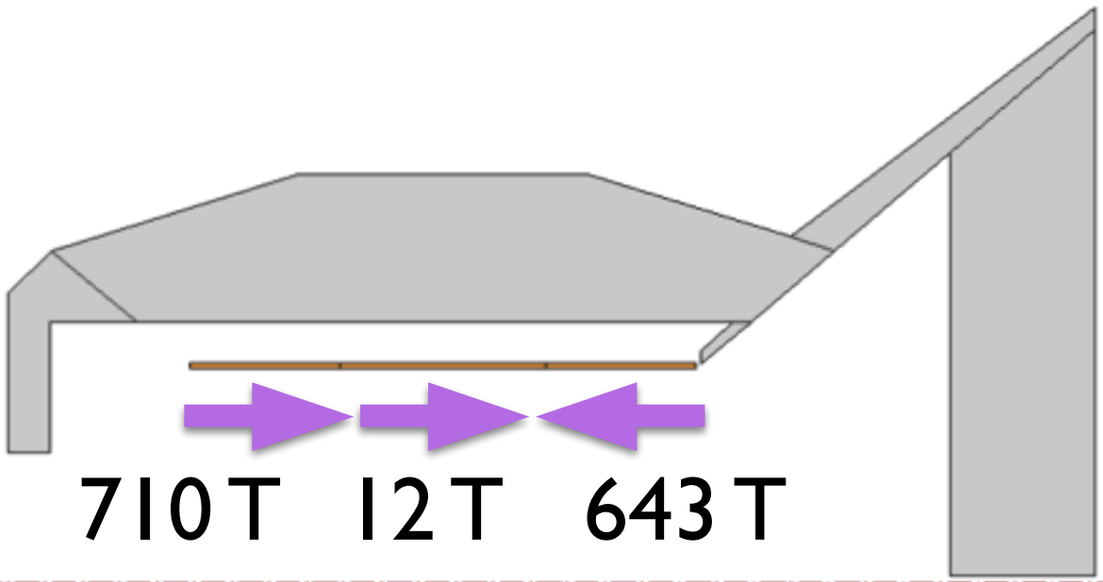


BABAR_V11 (Bmax = 12 T)



EPHENIX_V1 (Bmax = 2.2 T)

Forces on magnet coil



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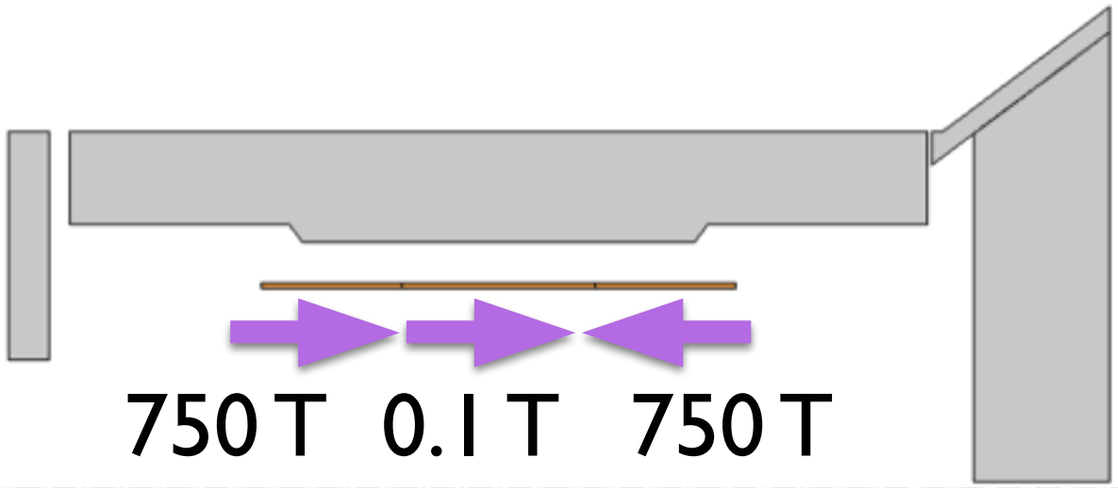
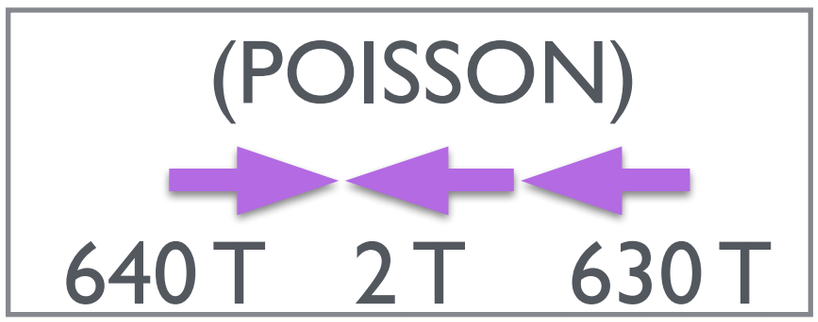
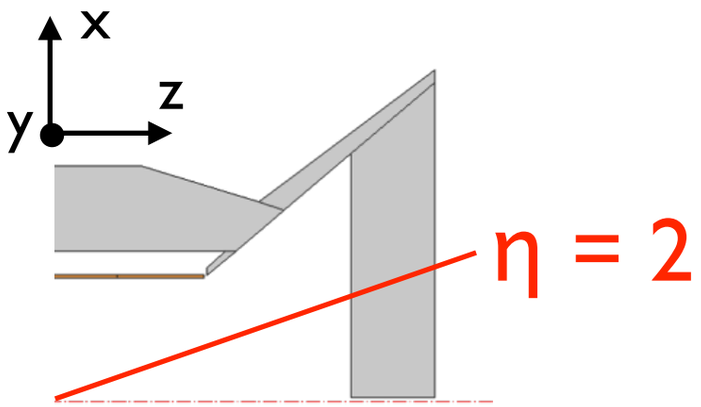
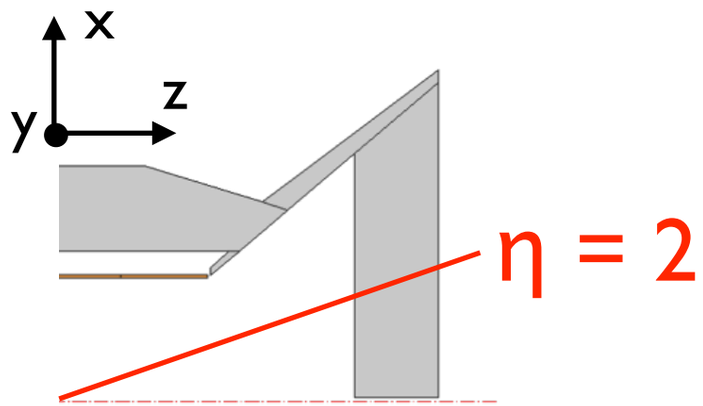


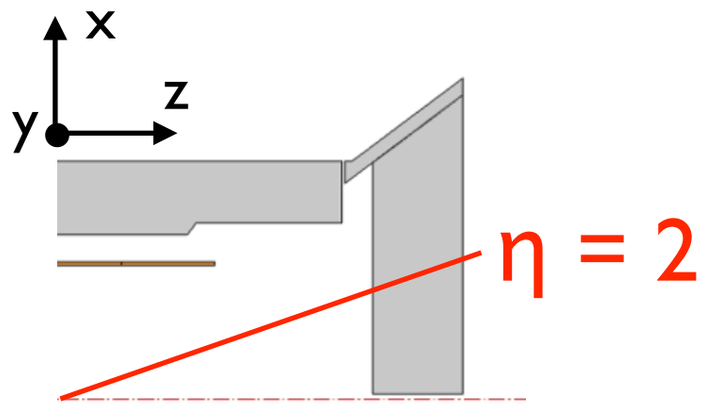
EPHENIX_V1

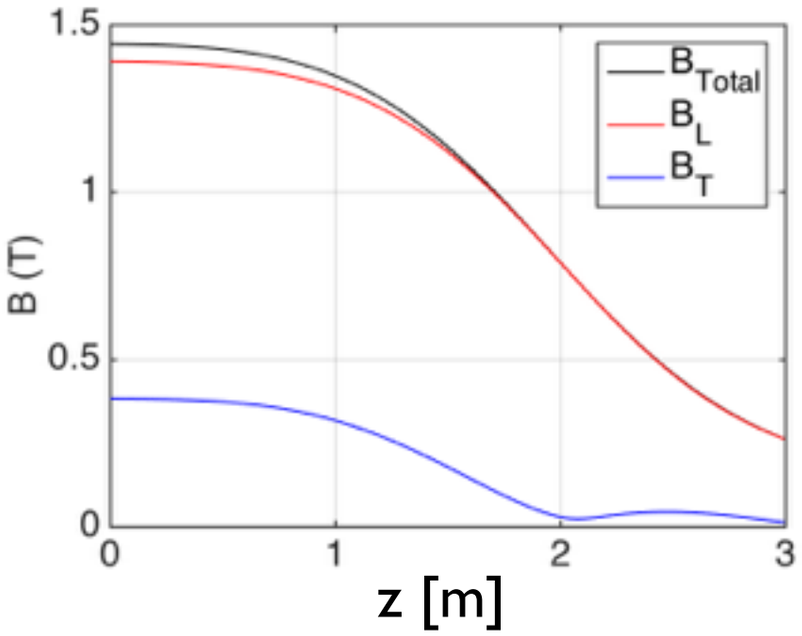


Charged particle bending (5 GeV)

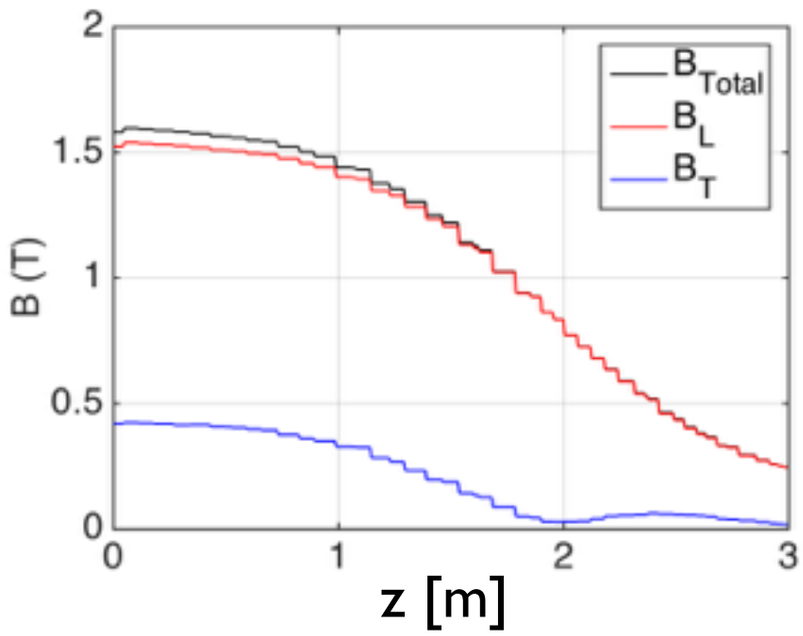








BABAR_V11 (POISSON)



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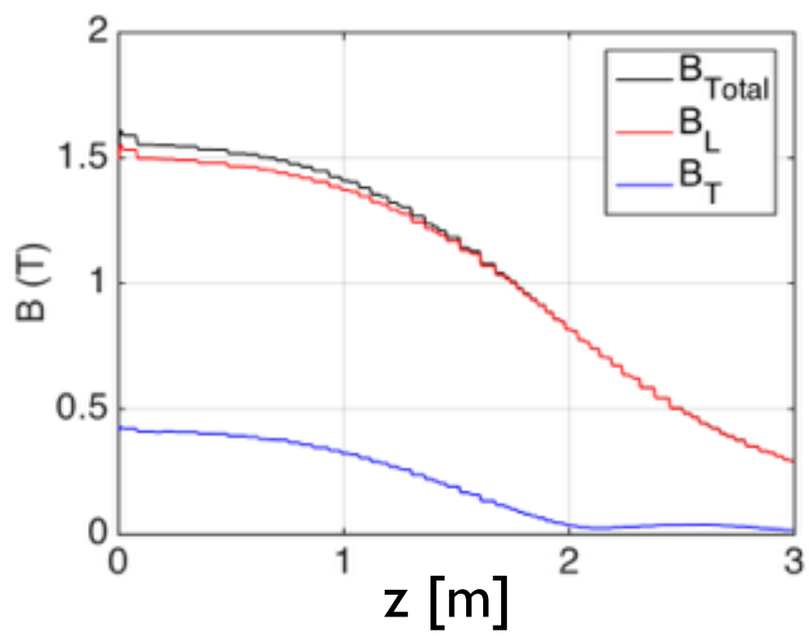
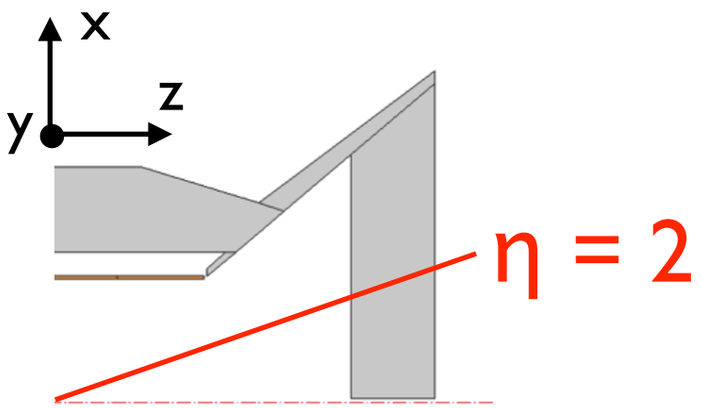
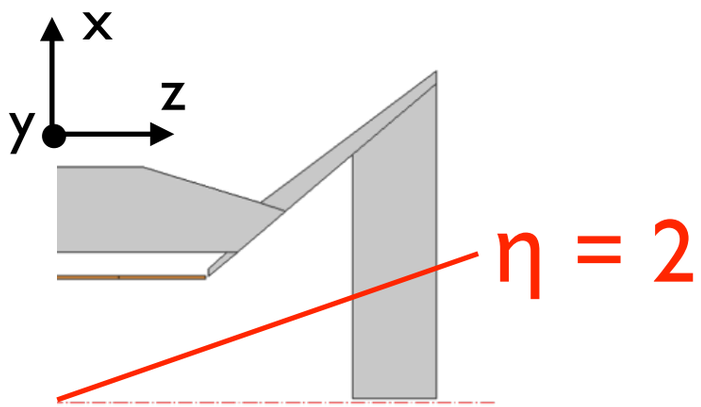
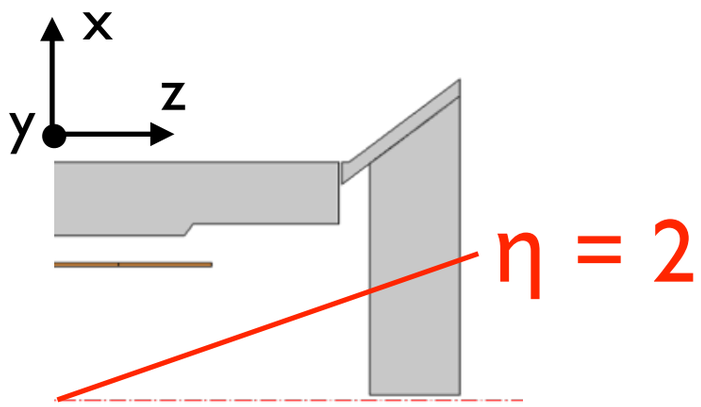


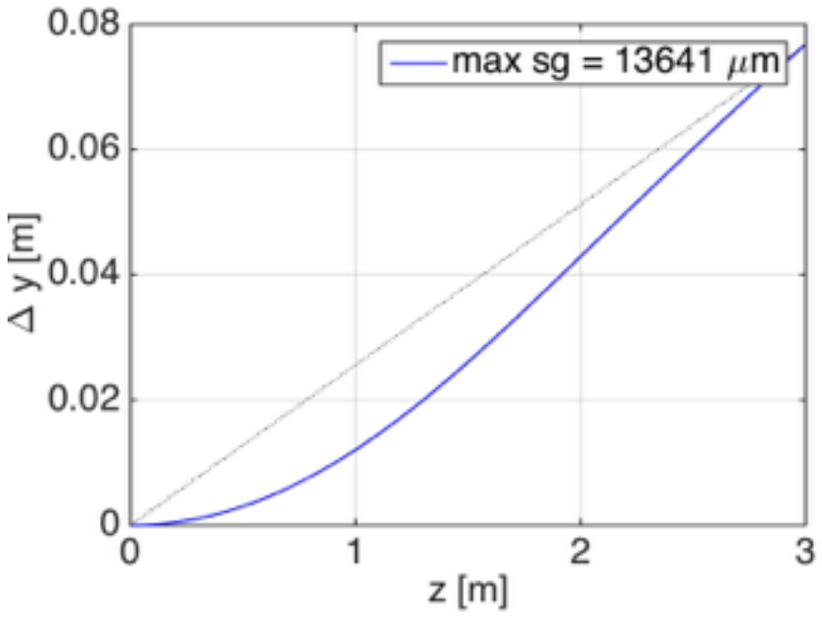
EPHENIX_V1

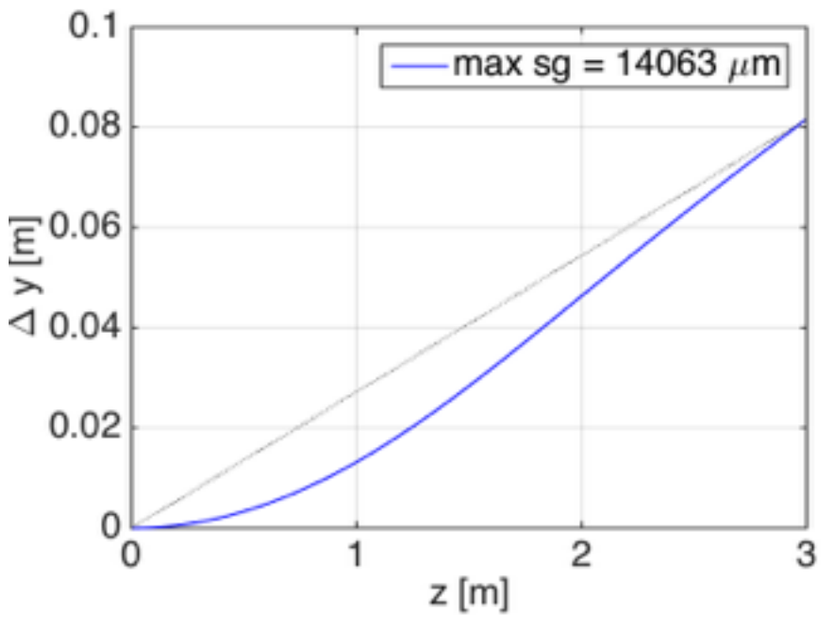
Charged particle bending (5 GeV)

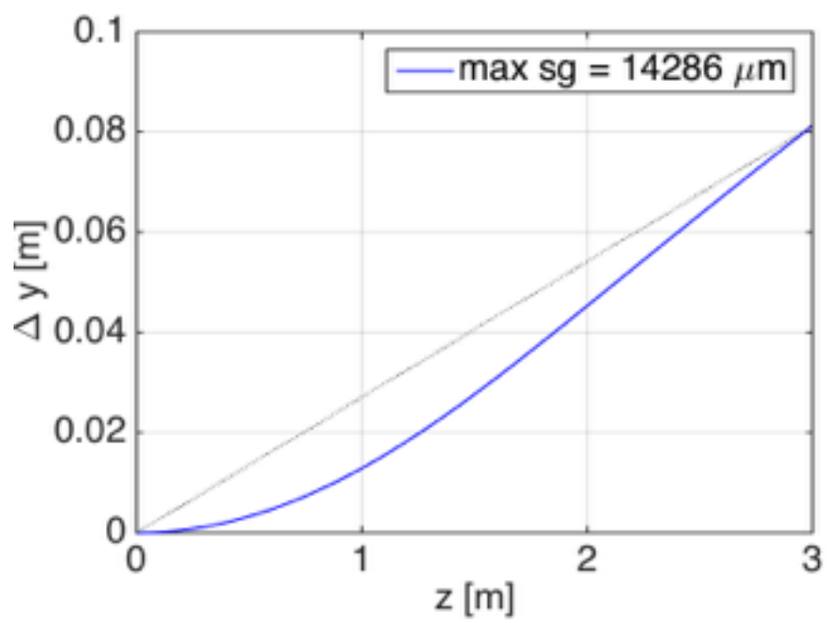










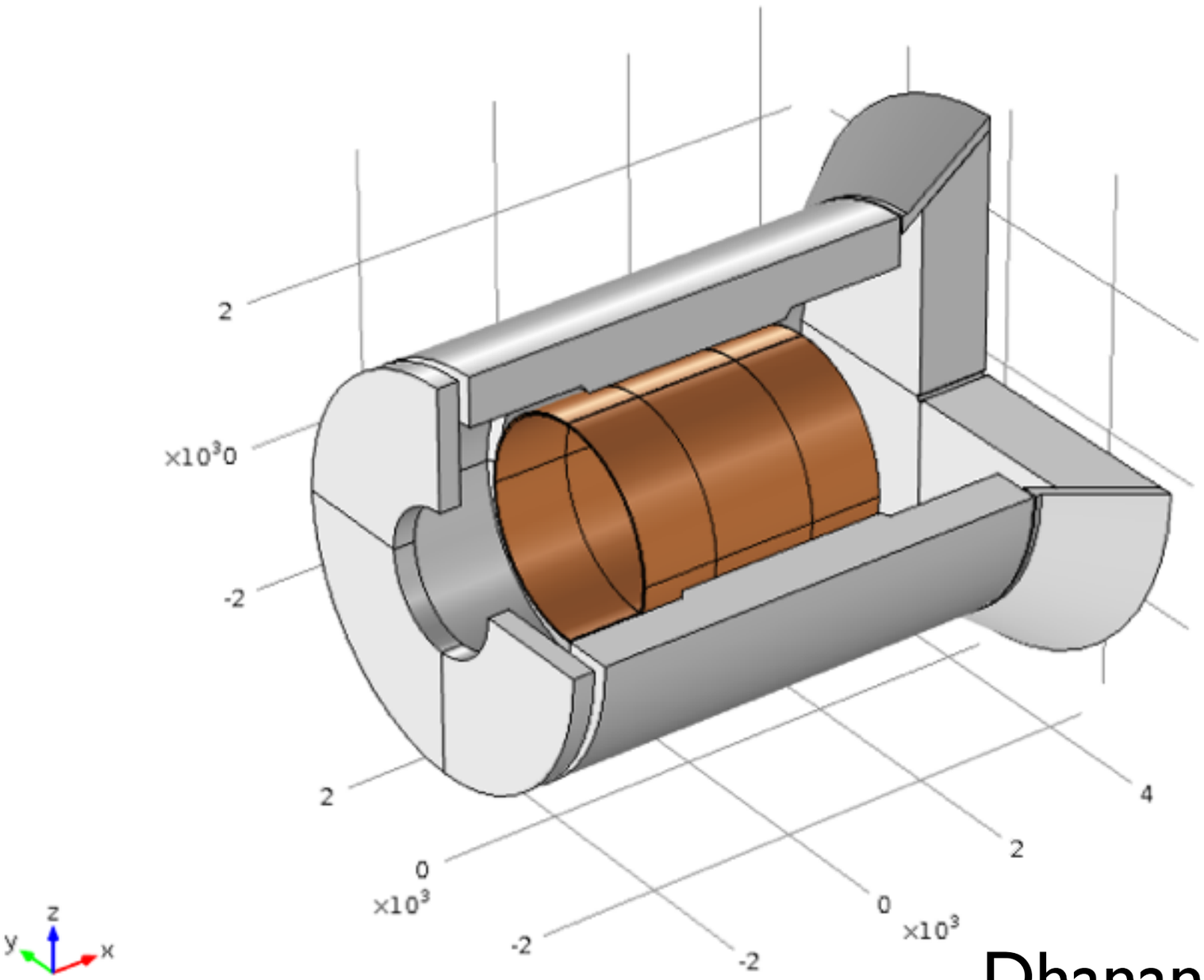


BABAR_V11 (POISSON)

BABAR_V11

EPHENIX_V1

Next: 3D Model in COMSOL



Dhananjay (SBU graduate student) started looking into this.

Summary

Promising first look at new yoke design EPHENIX_V1 (no steel saturation, balanced forces)

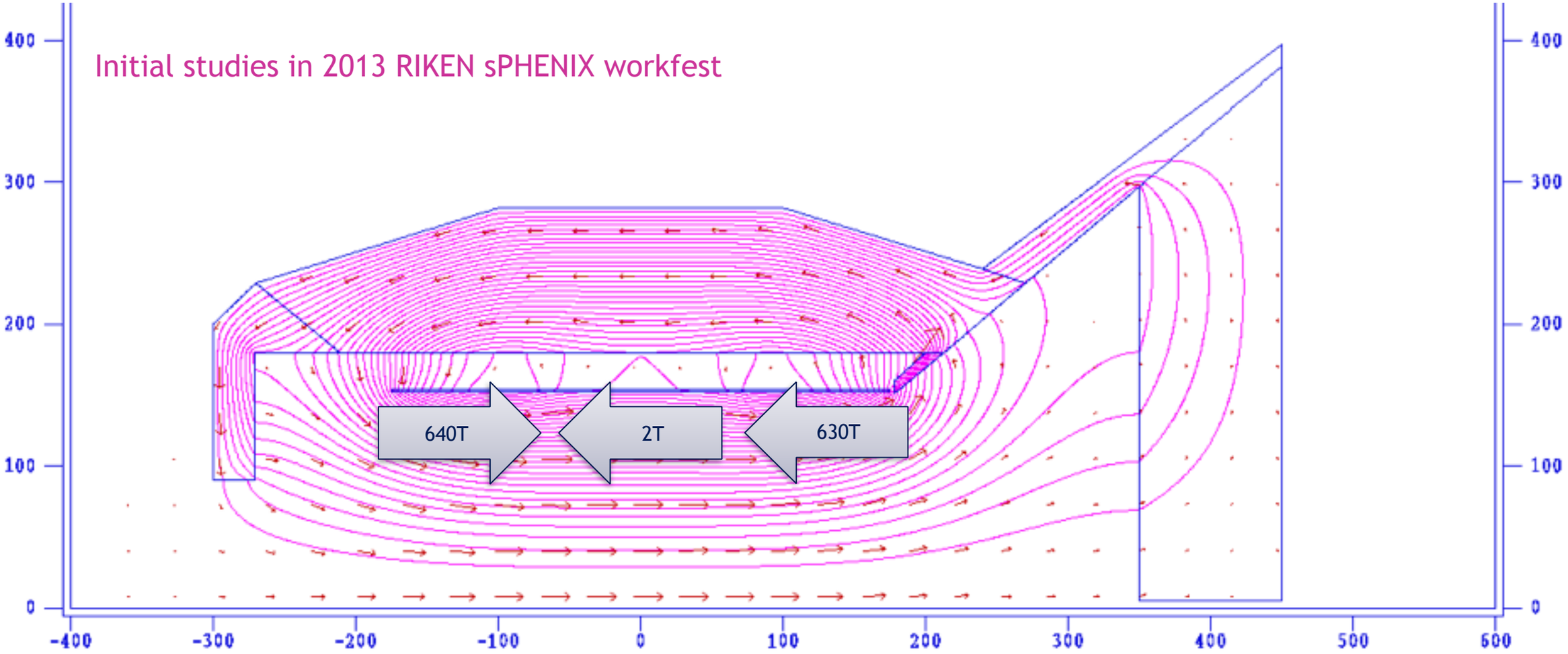
Which parameters need to be further tuned?

What else should we check?

ADDITIONAL SLIDES

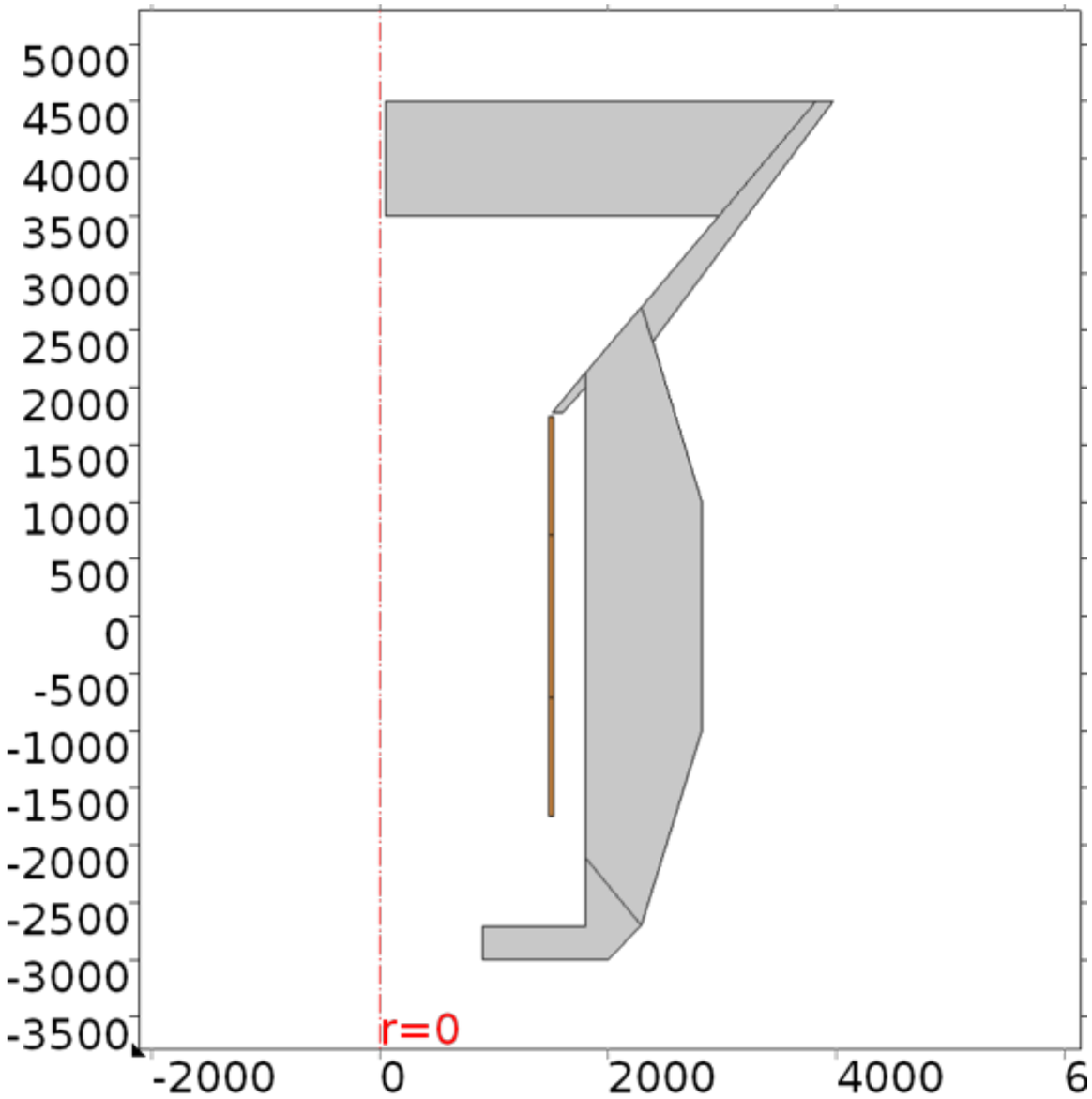
POISSON Field Map / Force Calculation for BABAR_V11

Initial studies in 2013 RIKEN sPHENIX workfest



J. Huang

BABAR_V11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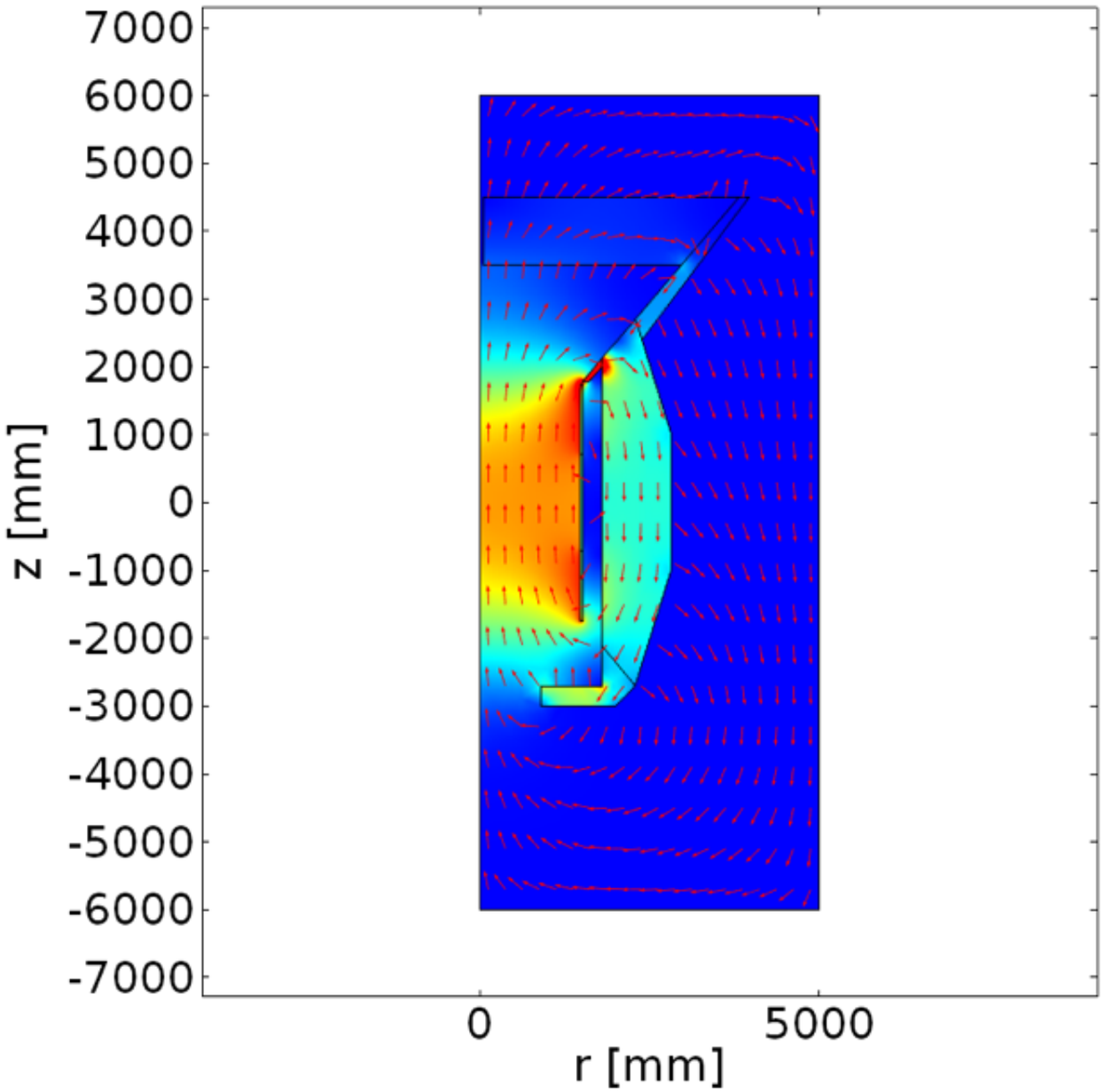
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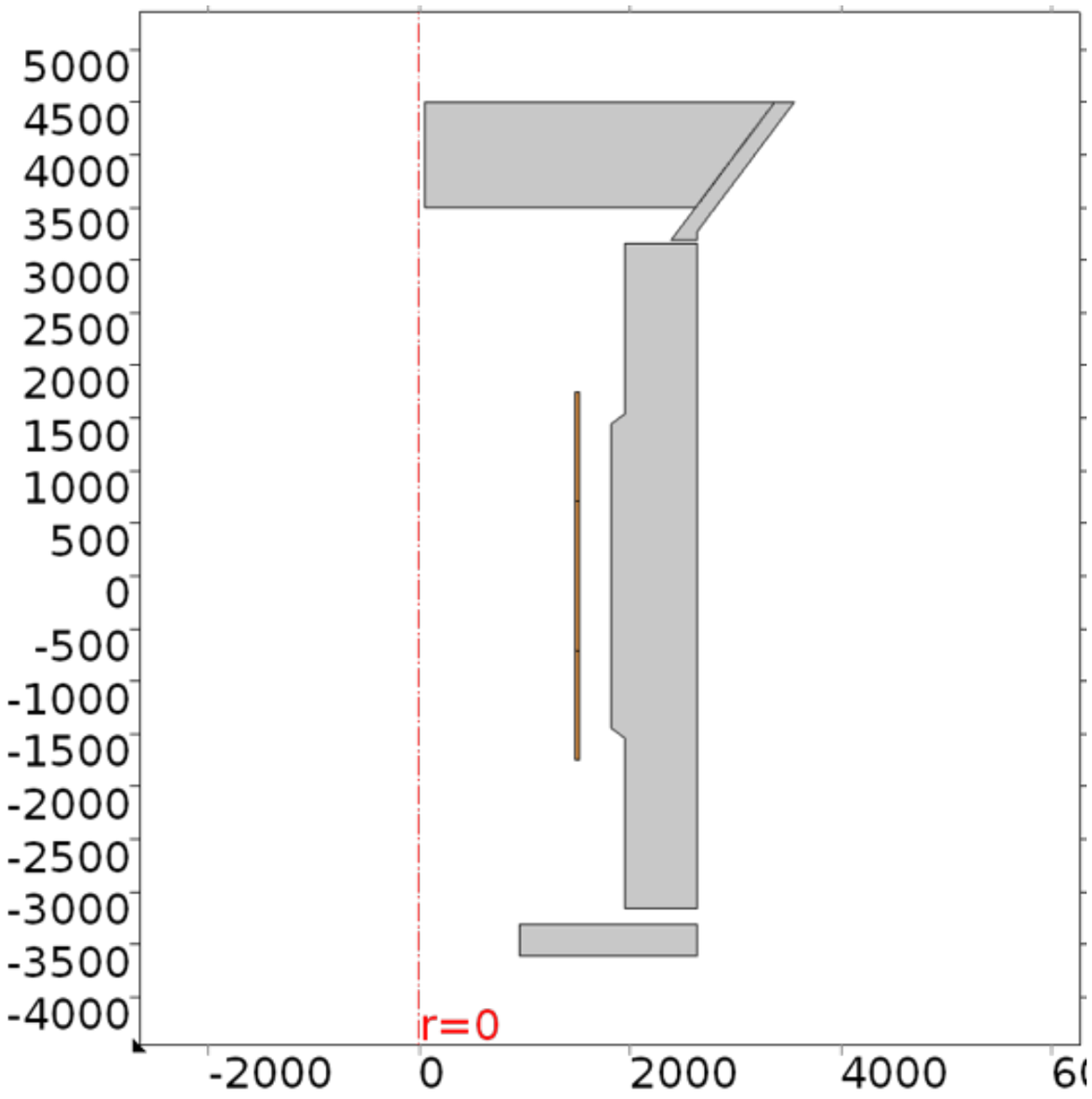
EPHENIX_V11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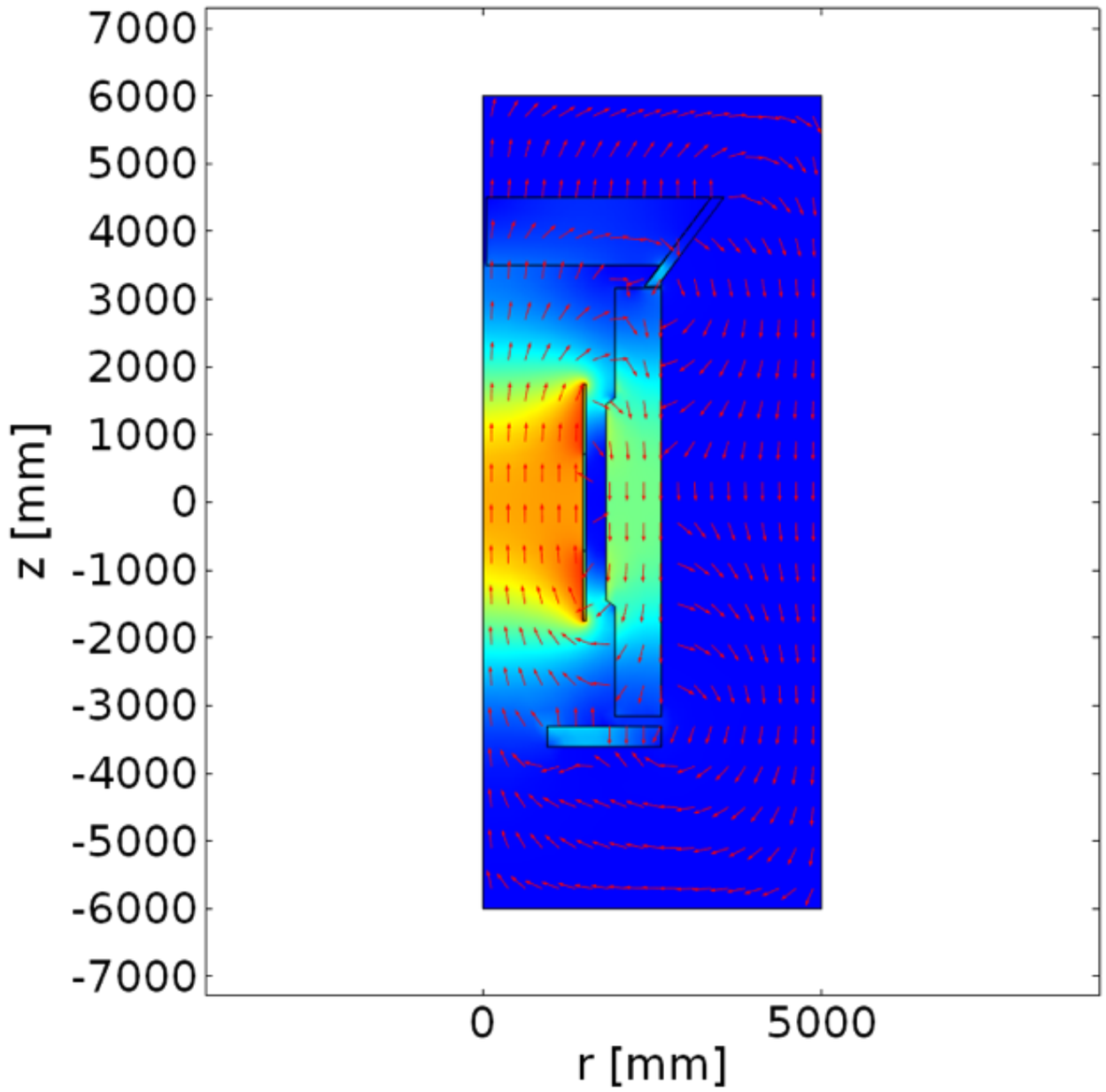
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